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PILOT DECISIONS ARE THE RESULT OF MANAGEMENT DETERMINING FLIGHT SAFETY

I Gusti Bagus Mahendra Putra[1], Hery Winoto Tj[2], Soegeng Wahyoedi[3]
[1,2,3]Faculty of Economics and Business, Universitas Kristen Krida Wacana Jakarta
Corresponding E-mail: hery.winoto@ukrida.ac.id

Abstract

Aviation safety is the ultimate goal of aviation in both civil and military in several accident reports and data from the aviation safety directorate of the Indonesian Army Aviation Center (Puspenerbad) human factors rank first cause of accidents as much as 74%. The purpose of this study is to determine the magnitude of the influence Flight Experience and Flight Proficiency against pilots decision making which has implications for aviation safety. The method in this study used quantitative descriptive analysis, with 99 respondents. Data collection is carried out by distributing questionnaires Google Forms and analyzed with the app SmartPLS 4.0. The conclusions obtained in this study put Flight Experience and Flight Proficiency does not affect flight safety if not mediated by the pilot decision making and flight safety is affected by pilots decision making.

Keywords**: *flight experience, flight proficiency, Pilot Decision making, Flight safety***

1. INTRODUCTION

Aviation safety is the main and absolute thing for every aviation person, both civil and military. The ultimate goal of every flight is the movement of personnel and materiel from one place to another in safety and security. Flight safety cannot be separated from the principles of management science known as POAC (Planning Organizing Actuating Controlling) carried out by a pilot before, during and after carrying out a flight. Aviation safety is also the center of attention by the Army Aviation Center, abbreviated as Puspenerbad which is the central implementing agency at the Mabesad level which is directly under Kasad. Puspenerbad was established on November 14, 1959 with the main task of organizing branch development, personnel development and aviation functions of the Indonesian Army, in order to support the tasks of the Indonesian Army. Flight functions include Battle intelligence, Maneuver, Gunfire, Protection and Support. The flight function is carried out directly by Air Crew where the Pilot as a Decision Maker in accordance with orders from the upper command. Data from the Directorate of Flight Safety and Work of Puspenerbad recorded that from 1972 to 2022 there were 78 aircraft accidents in the Puspenerbad environment which resulted in personnel and material losses. However, the span of 2013 to 2016 the most accidents compared to the previous year or after which resulted in personnel and material losses that may be caused by various factors involving pure factors (man / human, media, machine, mission and management) as many as 53 accidents where human Ranked first 39 times (74%) followed by media (13%) and mission (13%).

This condition, if left unchecked, will endanger flight safety within the TNI, especially the Army, in this case puspenerbad as a flight operator on the ground. The subsequent impact of aviation safety is a huge gamble for Puspenerbad's professionalism. According to previous research conducted, flight (Gautam & Garg, 2021) experience has a protective effect on the risk of flight accidents. A pilot with a higher flight experience is most likely to be able to respond better and faster to events leading up to an accident, but also decision making while in flight tends to reduce the occurrence of avoidable accidents (Gautam & Garg, 2021) . Flight experience of a pilot can

be measured in terms of the length of time the pilot has a career as a pilot and the type of flight mission carried out by the pilot.

Subsequent research has found that pilots with higher total flight hours make better judgments and decisions about dangerous weather situations than pilots with lower total flight hours (Landry , 2021) . Landry, 2021 said accidents involving experienced pilots suggest that total flight hours may not be an adequate measure of experience but rather suggest using other dimensions to measure experience. Further research on the effect of accidents identified from human factors one of them is due to the influence of flight experience pilot (Noah, 2019). The longer a pilot does not perform flight proficiency , the technical ability of a pilot will be much decreased especially faced with critical conditions in flying aircraft that require pilots to make decisions (Rajee Olaganathan & Role Angelo H Amihan , 2021). If we refer to flight rules, in this case FAA, a pilot instructor, both military and civilian, must carry out flight (Domingo, n.d.) proficincy at least 6 calendar months if they are going to carry out flight instructional, meaning that whatever qualifications a pilot has, flight proficiency greatly affects pilots in carrying out flights by making correct decisions with the aim of flight safety.

The following research also explains that good pilot decision making is very important to complete every flight safely, which means that decision making greatly affects flight safety. (Zarrin K. Chua et al, 2019). The benefits of this research that will be obtained are that Puspenerbad as the central implementing agency in the aviation sector must be able to professionally carry out every task entrusted to both OMP (War Military Operations) and OMSP (Military Operations Other than War). Which can be evaluated gradually starting from the readiness of the flight crew, in this case the TNI AD pilot who will be the decision maker in every flight task. From the background above, the author conducts research to assess the influence of flight experience, and flight proficiency on decision making which has implications for flight safety, the researcher will take the title "The Effect of Flight Experience, and Flight Proficiency on Pilot Decision Making Which has implications for flight safety in Puspenerbad Jajaran Semarang". The results of this research are contributed to science, especially strategy management science related to decision making so that it is expected to add references to theoretical studies, especially those related to flight experience, flight proficiency and decision making. And the results of this study make a meaningful contribution in managing human resources, especially pilots to determine and select pilots who are ready to become PIC (Pilot In Command) or pilots who are ready to be educated to become a pilot instructor. Furthermore, Puspenerbad will have indicators in each determining the pilot who is ready to operate with different tasks in each mission.

2. LITERATURE REVIEW

2.1 Flight Safety

Flight safety means a maneuver or flight completed without injury to persons, damage to aircraft or property, or violation of aviation safety regulations when meeting applicable aviation standards (Gautam & Garg, 2021) . In aviation safety research is not the occurrence (Majid et al., 2022) incident And accident on a flight. Thus it can be defined that flight safety is a series of flight activities that are held without injury, injury, damage, no violations and meet the standards of flight conditions.

2.2 Decision Making

Decision making is an action taken or decided by pilots in flight in accordance with the disciplines and technical capabilities possessed by pilots adhering to the principles of flight safety which is often called ADM (Aeronautical decision making (Federal Aviation Administration, 2016)). In the large dictionary of science, decision making is the choice of decisions or policies based on certain criteria. Decision making is the choice of action from among the alternative courses of action that seem available to the decision maker. Decision making implies the direction of action of the company, the commitment of resources and the acceptance of risks associated with the decision (Murder , 2017). Decision making is assessed as a process that chooses a preferred option or an action from among alternatives on the basis of given criteria or strategies Meanwhile, according to Baron and Byrne (2012), decision making is a process through a combination of individuals or groups and integrating existing information with the aim of choosing one from various possible actions (Wang & Bequiet, 2007). In-flight decision making is a decision taken by the pilot as pilot in command (PIC) in flight. Decision making of a pilot as a decision in dealing with weather and pilot decisions will be more careful when pilots have experience in dealing with bad weather (Goh & Wiegmann, 2002) (Sour & Feigh, 2013). Good knowledge and education regarding pilot fatigue will make better decisions (J. Keller et al., 2019) From some of the expert opinions above, it can be concluded that pilot decision making is the result of the pilot's thought process to choose actions from a situation or problem that occurs so as to get the most appropriate action choices for that situation.

2.3 Flight Experience

The word flight means flying or flight and experience means an experience but when combined into flying experience. In the Oxford Learn Dictionary, experience is the knowledge and skills we gain by doing something within a certain period of time. (Hawke et al., 2022) Mention that the experience is a personal life journey, with its own challenges, successes, and personal meaning. Also mentioned flight experience is the length of time a pilot has been in carrying out flying duties and the total flight hours obtained. Mentioning that flight (Gautam & Garg, 2021) experience is the number of flight hours obtained in carrying out a flight or other words can be interpreted that the length of time taken by a pilot carries out flying duties (Goh & Wiegmann, 2012) Flight experience is not only from flying hours but the type of flight is also one component of flight experience Pilots with high (Landry, 2021). flight experience make better decisions in dealing with the weather (Sour & Feigh, 2013) From some of the above understandings it can be concluded that Flight Experience is the knowledge and skills obtained by a pilot with the amount of time or flight hours that have been recorded by a pilot with various types of flights taken.

2.4 Flight Proficiency

Flight proficiency comes from two words, namely flight itself and proficiency if interpreted according to the Oxford Learn Dictionary, proficiency means high-level competence or skills can also be said to be proficiency or expertise. Competence is the ability of individuals to perform a job correctly and have excellence based on matters concerning knowledge, expertise and attitudes. According to Dessler (2017) competence is a personal characteristic that can be demonstrated such as knowledge, skills and personal behaviors such as leadership. suggests that an ability to carry out or perform a job or task based on skills and knowledge and supported by the work attitude required by the job. (Winoto Tj & Tecoalu, n/a).

Competency is an ability to carry out or perform a job or task based on skills and knowledge and supported by the work attitude demanded by the job. Thus, competence indicates skills or knowledge characterized by professionalism in a particular field as something paramount, as the flagship of a particular field, in this case the technical field of aviation. (Wahyoedi et al., 2022) (Rajee Olaganathan & Role Angelo H Amihan, 2021) Flight proficiency is the level of proficiency or skill of a pilot calculated from how long a pilot has not flown a flight. Flight proficiency also includes the skills and expertise of pilots that can be calculated based on the time interval during which the pilot made his last flight (J. C. Keller, 2013).

From some of the definitions above, it can be concluded that flight proficeincy is the flying ability possessed by pilots based on skills, attitudes, and knowledge in carrying out flights. The novelty of this research is the decision making variable as a mediating variable of flight experience and flight proficiency that has not been revealed by previous studies such as by Gautam and Garg. (2021), previous research placed stress, safety attitude and flight experience as variables that determine the potential involvement of pilots in dangerous conditions. Next, research conducted by Goh (2012) Relating Flight Experience and Pilots' Perceptions of Decision-Making Skill which examines the relationship between flight experience and perception of a pilot's decision-making skill where the latest research is to place flight proficiency as a variable.

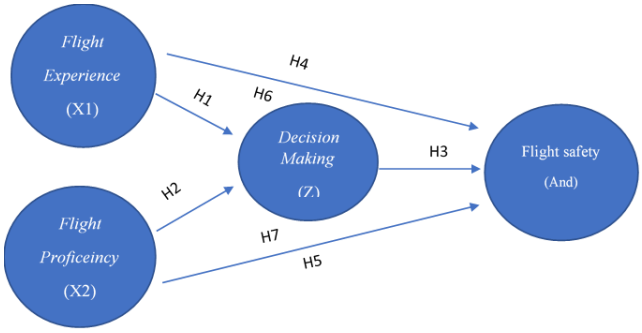

Figure 1 Conceptual framework

Hypothesis Development

The hypothesis based on the above coceptual framework is as follows:

H1 : Flight experience Affects pilots decision making
H2 : Flight proficiency Affects pilots decision making
H3 : Pilot Decision making Implications for flight safety
H4 : Flight experience affect flight safety
H5 : Flight Proficiency affect flight safety
H6 : Flight experience affect Pilot-mediated flight safety Decision Making
H7 : Flight Proficiency affect Pilot-mediated flight safety Decision Making.

3. RESEARCH METHODS

This research was conducted in a span of 3 months, from December 2022 to February 2023, to 99 pilots in Puspenerbad.

The instrument used to collect data is a questionnaire distributed using a google form sent via whats app to each respondent. The steps in analyzing the data include measurement model test, reliability test, structural model test and Hypothesis Test using SmartsPLS application.

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4. RESULTS AND DISCUSSION

The indicator is valid if the loading factor is > 0.7, but the indicator value between 0.4 to 0.7 can still be tolerated (Hair et al., 2017). In this study, an indicator is declared valid if the loading factor is > 0.5. And all indicators in this study are valid and there are no reliability problems in the study. The next test is carried out through the Q-square test with the formula Q-squar = 1 – (1-R1) (1-R2) thus the value of Q-square = 1-(1-0.73)(1-0.59.1) = 0.8893. Based on the results of the calculation above, a Q-square value of 0.8893 is obtained. This shows the large diversity of research data that can be explained by the research model 88.9% while the remaining 11.1% is explained by other factors that are outside this research model.

4.1 Hypothesis Testing

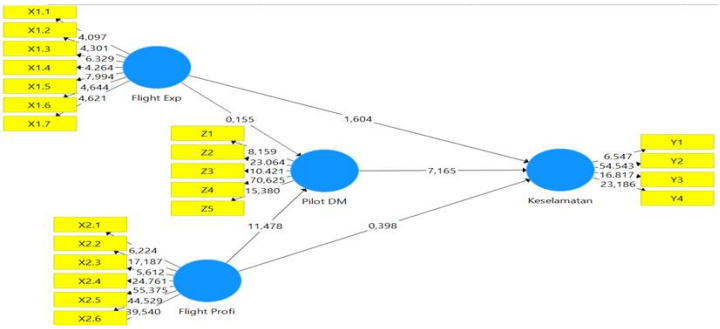

Figure 2 Hypothesis Testing

Hypothesis testing is done through t-test and p-value test. The hypothesis will be accepted if the t-value > of 1.96 or the nilia p-value < 0.05.

Table 1 Direct Influence Hypothesis Testing

Variable	T Statistics	P Values
Flight Exp → Safety	1,604	0,109
Flight Exp → Pilot DM	0,155	0,877
Flight Profi → Safety	0,398	0,690
Flight Profi → Pilot DM	11,478	0,000
DM Pilot → Safety	7,165	0,000

Source: SmartPLS Output (2023)

From the table above shows that there is not enough evidence to state that flight experience has a significant positive effect on flight safety. There is not enough evidence to suggest that flight experience has a significant positive effect on pilot decision making. There is not enough evidence to suggest that Flight Proficiency has a significant positive effect on flight safety. There is enough evidence to suggest flight proficiency has a significant positive effect on pilot decision making. There is insufficient evidence to suggest that pilot decision making has a significant positive effect on flight safety.

4.2 Indirect influence

Indirect influence will test whether the mediating variable is able to mediate between exogenous variables and endogenous variables.

Table 2 Testing Indirect Influence Hypotheses

Variable	T Statistics	P Values
Flight Exp → Pilot DM → Safety	5,595	0,000
Flight Profi → Pilot DM → Safety	0,151	0,880

Source; SmartPLS Output (2023)

From the table data above shows that there is enough evidence to state that pilot decision making mediates the effect of flight experience on flight safety. And there is not enough evidence to suggest that pilot decision making mediates the effect of flight proficiency on flight safety.

5. DISCUSSION

The results of the research analysis that has been carried out show the following results: Flight experience has a significant positive effect on flight safety but does not have enough evidence. This is in line with previous research conducted by Gautam &; Garg (2021), Goh (2012),) in which aviation safety has an effect and is proven in improving flight safety, so there is still a need for proof in using variable flight experience in determining flight safety. However, in line with research conducted by Landry et al (2021), this is because the flight experience does not only consist of flight hours, but the types of flights carried out specifically are also experiences, so they still need proof. There is not enough evidence to state Flight Experience Significantly Positive Effect on Pilots decision making. In this study there is not enough evidence even in theory that an experience will influence a person in making decisions.

The results of this study are not in line with previous research conducted by Gautam &; Garg (2021), Goh (2012), Landry et al (2021) which stated that Flight Experience Significant influence on pilot decision making And it is proven in the discussion that a pilot who has high flying hours will make it easier for pilots to make aeronautical decision making. However, flight experience can not only be calculated based on flight hours, it needs other evidence that must be reviewed. Flight Proficiency has a significant positive effect on flight safety but does not yet have enough evidence. This is contrary to research previously conducted by Olaganathan and amihan 2021, Mizzi et al (2022) where the study stated that flight proficiency of pilots significantly affects flight safety in the discussion that the increase in the number of accidents in aviation is influenced by the low level of pilot proficiency in type rating Aircraft. However, back again on the results of this study it remains to be proven whether pilot flight proficiency has a significant effect on flight safety.

There is insufficient evidence to suggest that flight proficiency has a significant positive effect on pilot decision making. In the world of aviation based on aeronautical decision making flight proficiency a pilot also greatly affects a pilot's confidence in making a decision, proficiency in the type of aircraft rating and the type of flight carried out. By honing the skills of a pilot, it will make a pilot better at decision making. This is in line with research conducted by Olaganathan and amihan (2021), Mizzi et al (2022) where the study also found the same thing, namely stating that pilot flight proficiency significantly affects pilot decision making, in his research it is proven that flight proficiency is one of the factors that greatly influence pilots in making decisions or pilot decision making. Subsequent results show that there is sufficient evidence to suggest that pilot decision-making has a significant positive effect on flight safety.

This is in line with research conducted by Cahlil et al (2019), and Majid et al (2022), where the study states that Pilot decision making significantly affects flight safety. In the results of his research there is a direct influence and it is proven that pilot decision making determines flight safety. Subsequent results show that there is sufficient evidence to suggest that pilot decision making mediates the effect of flight experience on flight safety. This is in line with research conducted by Goh (2012) that pilot decision making mediating the influence of flight experience shows significant results, where more experienced pilots are better at making decisions so that with the right decision it will affect flight safety.

The results of the latter study show that there is not enough evidence to say that pilot decision making mediates the effect of flight proficincy on flight safety. The results of this study are not in line with the results of previous research conducted by Baron (2012), Chua, Z. K., &; Feigh, K. M. (2013), Keller J et al (2019), where that Pilot decision making mediates flight proficiency has a significant effect on flight safety. Thus, it needs to be proven again that flight proficiency mediated by pilot decisions will have a significant influence on flight safety.

6. CONCLUSION

Based on data analysis and research results and discussions that have been described, the following conclusions can be drawn:

a. Flight Experience has a positive effect on flight safety, but because there is not enough evidence, additional evidence is needed to state that flight experience affects flight safety.
b. Flight Experience has a positive effect on pilot decision making, however, from the results of the study there is not enough evidence so it still needs to be proven that flight experience is based on the theory that someone who has more experience will make better decisions.
c. Flight Proficiency has a positive effect on flight safety but does not have enough evidence so it still needs to be proven how flight proficiency affects flight safety.
d. Flight Proficiency has a positive and significant effect on pilot decision making, meaning that a pilot who has good and standardized flight proficiency will make pilots in flight make the right decisions. And if pilots do not carry out flight proficiency properly and standardized, it will potentially be bad in decision making.
e. Pilot decision making has a positive and significant effect on flight safety which means that safety in flight is determined by the decision of a pilot on the flight both in normal and emergency circumstances so that the results of a correct decision will create a safe and secure condition the key to flight safety based on pilot decision making that is true of a flight condition.
f. Pilot decision making mediating flight experience on flight safety has a positive and significant effect, this shows evidence that if in a flight pilot decision mediated by flight experience as a basis for decisions, it will affect flight safety both in normal and emergency situations.
g. Pilot decision making mediates flight proficiency on flight safety but does not have enough evidence so it still needs to be proven that pilot decision making mediates flight proficiency on flight safety.

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